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PHYSICS

CHEMISTRY

KEY POINTS & MCQS

Key Features:

- ✓Physics key points
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- ✓Chemistry MCQs
- ✓Physics formulas

By:

- Engr. Shamsul Amin
- Eng. Hidayatullah khan
- Bakht Afzal Khan (M.phil Physics)
- Sikandar Hayat (Gold medalist)
- Shah Faisal

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www.shamsulamin.mozello.com
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	waves in	
369.	In transverse waves the particle vibrate with the period and frequency of the	Source
370.	Mechanical waves cannot propagate through	Gases
371.	The time for one vibration is called	Time period
372.	In nature sound waves are	Compressional
373.	$v = \frac{\sqrt{T\,x\,L}}{M}$ or $v = \frac{\sqrt{T\,x\,L}}{M}$	Speed of transverse wave
374.	$v = \frac{\sqrt{E}}{\rho}$	Speed of longitudinal waves
375.	Speed of sound founded by Newton	281 m s^{-1}
376.	Speed of sound of Laplace's correction	332 m s^{-1}
377.	Theoretical value of sound is 16% less than	Experimental value
378.	Propagation of sound waves through air or gas is an	Adiabatic process
379.	Increase in speed of sound for each degree rise above 0^0 C is	0.61 m s^{-1}
380.	Speed of sound is directly proportional to the	Moisture and temperature
381.	Speed of sound is inversely proportional to the	Density
382.	Speed of sound is independent to the	Pressure
383.	The effect produced by the superposition of waves from two coherent sources, passing through same region is called	Interference
384.	In case of transverse waves constructive interference will occur if crest of one waves meet with another	Crest of another wave
385.	In case of longitudinal waves constructive interference will occur if compression of one waves meet with another	Compression of another wave
386.	If two waves arrive at same place at the same time but are out of phase(180^0)	Destructive interference occur
387.	The difference between frequencies of two waves is called	Beat frequency(N)
388.	N =f =	1/T
389.	The phenomenon of beats is used in finding unknown	Frequencies
390.	Perceived fundamental frequency of sound is	Pitch
391.	In reflection of mechanical waves the angle between incident and reflected pulse is	$\lambda/2$ or π or 180^0
392.	When transverse wave on string is reflected from a denser medium, there is a	phase change of 180^0
393.	When transverse wave on string is reflected from a rare medium, it suffers	No phase change
394.	The reflection of original sound from a certain object is received at 0.1 sec later than the direct sound is called	Echo
395.	The effective distance for echo is	17m
396.	Stationary waves is also called	Standing waves
397.	The distance between two successive nodes or anti-nodes is equal to the	$\lambda/2$
398.	The lowest characteristics frequency of vibration f_1 is called 1^{st} harmonic or	Fundamental frequency
399.	When source moves towards stationary listener, then the frequency of sound	Increases
400.	When source of sound moves away from stationary listener, then frequency	Decreases

401.	When the listener moves towards stationary source, then frequency of sound	Increases
402.	When the listener moves away from source, then the frequency of sound	Decreases
403.	When source and listener both moves towards each other, then the frequency	Increases
404.	When source and listener moves away from each other, then the frequency	Decreases
405.	Doppler effect is not confined to	Sound waves
406.	Doppler effect is applicable for	Light waves
407.	When ultrasonic waves are focused on a small space in liquid , the liquid is rapidly volatilized and large number of bubbles are formed this process is called	Cavitaions
408.	The transverse nature of light is verified with the phenomenon of	polarization
409.	The phase changes of 180^0 is equivalent to	$\lambda/_2$
410.	When water reach to an obstacle in the medium, they bend around in obstacle the region behind it, this is the evidence of the phenomenon of	Diffraction
411.	Electromagnetic waves do not require medium for their	Propagation
412.	When longitudinal waves propagate through a medium , the particle of the medium	Vibrate parallel to the direction of wave
413.	The wavelength of sound made from a tuning fork of frequency 330 Hz is nearly	330m ($v=f\lambda$)
414.	Two waves of same frequency and amplitude traveling in opposite direction along same position the waves is	Stationary waves
415.	If tension in a string remains constant and diameter becomes double its speed	Will become half
416.	In transverse waves the distance between consecutive crust and trough is	$\lambda/2$
417.	To find speed of wave we use	$V = f\lambda$
418.	Constructive interference occur if path difference between two monochromatic light is	Integral multiple of wavelength
419.	γ- rays have high energy photons than x-rays, Ultra violet and	Visible light
420.	The radio waves of constant magnitude are called	Carrier waves
421.	The world seismology stands for, An instrument used for detecting	earthquakes
422.	The motion of the source of sound with respect to stationary listener cause change in	Frequency of sound
423.	One light year is equal to	9.46×10^{15} m
424.	Sound waves move faster in	Hydrogen medium
425.	The velocity of earth satellite can be measured from the change in frequency or radio waves by using	Doppler effect
426.	Frequency of light does not change with	Nature of medium
427.	The phase change of 180^0 is equal to path difference	Half the wavelength
428.	If the width on the young's double slit experiment becomes double, the fringe spacing will become	Half
429.	Doppler effect is applicable to	Sound and light waves
430.	When a wave comes across an obstacle, it bands around an obstacle. This phenomenon is called	Diffraction
431.	Polarization of light shows that the nature of light is	Transverse waves
432.	The net exchange of heat between two bodies of same temperature is	Zero

882. The mechanical energy spent in over coming of opposition is converted into Electrical energy(appears on coil)
883. To find the direction of the induced e.m.f we use Fleming's right hand rule
884. The lenz's law refers to induce currents not to Induced emf
885. Current carrying coil produce magnetic field similar to that of Bar magnet
886. By faraday's da whenever a conductor is placed in a varying magnetic field, EMF is induced in the conductor and this EMF is called Induced EMF
887. Induced emf Is of two types, dynamically induced EMF and Statically induced EMF
888. When the conductor is moved in a stationary magnetic field in such a way that the flux linking it changes its magnitude, this EMF is called Dynamically induced EMF
889. When the conductor is stationary and the magnetic field is moving or changing then the EMF induced is called Statically induced emf
890. An example of dynamically induced emf is Dc generator
891. An example of induced emf is Transformer
892. Rate of production of electrical energy = ε I
893. The emf induced in the coil due to the change of its own flux linked with it is called Self-induced emf
894. The self-induced emf opposes the change of current in the coil which is known as Self-inductance or inductance
895. the self-inductance or inductance is given by $\varepsilon = -(\Delta N\Phi)/\Delta t$ and $\varepsilon = -L(\Delta I)/\Delta t$
896. The unit of Self-inductance is given by $L = \varepsilon(\Delta t)/\Delta I) = L = N\Phi/I$ L=1H= VAs-1
897. If induced emf is caused by increasing current the its direction is always opposite to increasing the current
898. Direction of self-induced emf is opposite to that of the Applied voltage
899. If emf is induced due to decreasing current then its direction is always Same is that of applied voltage
900. In fact, that affects magnetic field is also effects the Inductance of the coil
901. Inductance of the coil is increased by increasing the Number of turns
902. Inductance is increased by substituting an iron core for Air core
903. The property of the two neighbouring coils to induce voltage in one coil due to change of current in the other is called Mutual inductance
904. The magnitude of mutually induced emf is given by $\varepsilon = (\Delta N\Phi)/\Delta t$
905. The emf induced in a coil due to the changing current in the neighbouring coil is called Mutually induced emf
906. Mutually induced emf in coil B is directly proportional to the rate of current in coil in Coil A
907. The mutually induced emf is given by $M=N\Phi/I$
908. A force resisting the rotation would be generated is called Eddy currents
909. Heat would be generated by the induced current in cylinder is called Eddy current

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CHAP NO.14 ALTERNATING CURRENT

910. A theory describing relation between accelerating charges, circuits and electric and magnetic fields was given by James Clerk Maxwell in 1864 called electromagnetic theory.
911. Maxwell formulated four equations that are regarded as the basis of all electrical and magnetic phenomena.
912. Maxwell unified the subjects of optics and electromagnetism.

Alternating current and voltages

913. The voltage in direct current remains constant.
914. Source that produce potential difference of changing polarity with time is called as alternating source.
915. A voltage which changes its polarity at regular interval of time is called an alternating voltage.
916. Direction of current at any instant depends upon the polarity of the voltages.

A.C terminologies

917. The value of an alternating quantity at any instant is called instantaneous value.
918. One complete set of positive and negative values of an alternating quantity is known as cycle.
919. The time taken to complete one cycle of an alternating quantity is called time period.
920. The number of cycle that occurs in second is called frequency.

Importance of sine wave

921. Sine wave cause least disturbance.
922. Sine wave is smoothest.
923. When current in capacitor, inductor or transformer is sinusoidal the voltage is also sinusoidal.

Values of alternating voltages and currents

924. The maximum value reached by an AC waveform is called its peak value.
925. The peak value of sine occurs twice each cycle.
926. The average value of waveform is the average of all its value over a period of time.
927. Average value over one cycle is zero.
928. The effective value in AC system is called root mean squared or R.M.S value.
929. The effective or r.m.s value of an alternating current is that steady current which when flowing through a resistor produce the same amount of heat as that produced by the alternating current when flowing through the same resistance for the same time.

Phase of AC

930. Phasor is short for phase vector.
931. When two alternating physical quantities of the same frequency have different zero point, they are said to have a phase difference.
932. A rotating line for the representation of the sinusoidal alternating voltages or current is called phasor.
933. In AC circuits, currents and voltages are all sinusoidal functions.

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1270. When electrons are removed from the atoms are attracted towards the wire, and in the process they ionize other atoms in their path. This result is an avalanche of electrons, which produce a current pulse at the output of the tube.

Solid State Detector

1271. A solid state detector or semi-conductor diode detector is essentially a reversed –biased P-N junction.
1272. A P-N junction diode is a device which passes current readily when forward-biased and impedes the flow of current when reversed-biased.
1273. The internal electric field sweeps the electrons towards the side of the junction connected to positive side of the battery and the holes are swept towards the negative side. This creates a pulse of current.
1274. The duration of pulse is 10^{-7}s.

Nuclear Reactions

1275. It is possible to change the structure of nuclei by bombarding them with energetic particles.
1276. A collisions that change the identity or properties of the target nuclei, are called nuclear reactions.
1277. To convert u energy to MeV, multiply u by 931.

Nuclear Fission

1278. Emission of beta negative particle increase atomic number by one, more elements can be formed.
1279. Neutron bombardment can cause a uranium nucleus to break apart, producing two or more fragments of moderate and comparable size. This process was called nuclear fission.
1280. Only U-235 goes under fission reaction not U-238.
1281. There is decrease in mass in fission reaction so energy is released.
1282. One thermal neutron strikes a uranium nuclei, three neutrons are emitted.
1283. ${}_0n^1 + {}_{92}N^{235} \rightarrow {}_{36}Kr^{92} + {}_{56}Ba^{141} + 3{}_0n^1 + Q \rightarrow$ the decrease in mass is 0.215 u = 0.125 x 931 = 200 MeV
1284. When one atom undergoes fission 200MeV of energy is released.
1285. If 1g uranium which contain 10^{19} atoms undergoes fission, the energy released will be 200×10^{19} MeV = 3.2×10^{8} j.
1286. 1kg of uranium delivers as much energy as the combustion of about 3000 tons of coal.

Fission chain reaction

1287. Fission chain reaction is principle of atomic bomb.
1288. When one uranium atom undergoes fission it releases 3 neutrons.
1289. If more than one neutrons is able to cause the neutrons, it will cause more neutrons rapidly.
1290. The mass of uranium must be greater than some minimum mass called the critical mass or critical size.

Fusion Reaction

1291. Experimental research reactor called tokamaks used for fusion.
1292. When two light nuclei combine to form a heavier nucleus, the process is called nuclear fusion.

1293. The energy liberated in the fusion of light nuclei into heavier ones is often called thermonuclear energy.

1294. The basic exothermic reaction in stars, including our own sun and hence the source of nearly all of the energy in the universe – is the fusion of hydrogen nuclei into helium nucleus.

Proton Proton Cycle

$_1H^1 + {}_1H^1 \rightarrow {}_1H^2 + e^+ + \nu$

$_1H^1 + {}_1H^2 \rightarrow {}_2He^3 + \gamma$

$_2He^3 + {}_2He^3 \rightarrow {}_2He^4 + {}_1H^1 + {}_1H^1$

→ the energy liberated is 24.7 MeV.

Carbon Cycle

$_1H^1 + {}_6C^{12} \rightarrow {}_7N^{13}$

$_7N^{13} \rightarrow {}_6C^{13} + e^+ + \nu$

$_1H^1 + {}_6C^{13} \rightarrow {}_7N^{14} + \gamma$

$_1H^1 + {}_7N^{14} \rightarrow {}_8O^{15} + \gamma$

$_8O^{15} \rightarrow {}_7N^{15} + e^+ + \nu$

$_1H^1 + {}_7N^{15} \rightarrow {}_6C^{12} + {}_2He^4$

→ the energy released in carbon cycle is 24.7 MeV.

1295. Carbon carbon cycle is more efficient at high temperature.

1296. Proton proton cycle is more efficient at low temperature.

1297. Stars hotter than sun obtain their energy from carbon carbon cycle.

1298. Stars cooler than the sun obtain their greater energy from proton proton cycle.

Basic forces of Nature

1299. All particles in nature are subjected to four fundamental forces:

- Strong
- Electromagnetic
- Weak
- Gravitational

1300. The strong force is very short-ranged and is responsible for the building of neutrons and protons into nuclei.

1301. The strong force is very short-ranged and is negligible for separation greater than 10^{-14}m.

1302. The electromagnetic force, which is about 10^{-2} times the strength of the strong force, is responsible for the binding of atoms and molecules.

1303. The electromagnetic force is long-range that decrease in strength as the inverse square of the separation between interacting particles.

1304. Force:

- Strong → short-range
- Weak → short-range
- Electromagnetic → long-range

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277. Following values cannot be determined. However, change in them can be measured and calculated:
- Internal energy (E)
- Enthalpy (H)

278. Increase in internal energy can result:
- Temperature increase
- Phase change
- Chemical reaction

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First Law of Thermodynamics

279. First law of thermodynamics is in fact, the law of conservation of energy.
280. Law of conservation of energy states that energy can neither be created nor destroyed.
281. Energy is transferred between system and surrounding in the form of heat and work.
282. The first law of thermodynamics can be written as follows.
- $q = \Delta E + w$
- $\Delta E = q - w$
- $\Delta E = q + w$

283. the only type of work in thermodynamics is the Pv pressure-volume work.
284. Work is done when a system expands.
285. Work done by system and energy absorbed by system are taken as positive.
286. At constant volume, no work is done.
287. Heat absorbed at constant volume is used to increase the internal energy only and no work is done. $\Delta E = q$.
288. Unit of work and heat is Nm or Joules (J).

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Enthalpy of system and standard changes

289. Enthalpy means heat content.
290. The total heat content of a system at constant pressure is called enthalpy of a system.
291. The enthalpy of a system is given by: $H = E + PV$
292. Change in enthalpy is given by: $\Delta H = \Delta E + P\,\Delta V$
293. Heat evolved or absorbed at constant pressure during a process or a reaction is equal to change in the enthalpy of the system.
294. ΔH is positive when heat is absorbed.
295. ΔH is negative when heat is evolved.
296. Enthalpy for solids and liquids are $\Delta H = \Delta E$, because there is small change in volume and ΔV can be neglected.
297. Standard enthalpy change, ΔH^0: the change in enthalpy measured at room temperature (298K) and one atmospheric pressure when the reactants and products are in their standard or natural states is called standard enthalpy change.
298. The standard enthalpy ΔH^0 of the elements in their standard states have given the value zero.
299. ΔH^0 have positive values at high temperature.
300. ΔH^0 have negative values at low temperature.

301. For all solids and liquids: $\Delta H = \Delta E$.
302. No work is done at constant volume.
303. Pressure-volume work is form of mechanical work.

Heat Capacity

304. Heat capacity depends on Mass.
305. The heat absorbed to raise the temperature by one degree or one kelvin is called heat capacity.
306. The SI unit of heat capacity is joule per kelvin or JK^{-1}.
307. Heat capacity is expressed in two ways:
    - Specific heat
    - Molar heat capacity
308. The amount of heat absorbed by one gram of substance to raise the temperature by one degree is called specific heat.
309. The amount of heat required to raise the temperature of one mole of a substance through one degree or one kelvin is called molar heat capacity.

Calorimetry

310. The numerical value of the enthalpy of the reaction depends on conditions, the pressure and the temperature under which the reaction takes place.
311. The standard enthalpy of H_2 at 1 atm and 298 K is zero.
312. H_f^0, Here subscript "f" stands for formations and superscript "^{0}" indicates enthalpy at standard state.
313. **Standard enthalpy change of reaction** is equal to difference between the sum of the standard enthalpies of formation of products and the sum of the standard enthalpies of reactants i.e

$$\Delta H^0 = \Sigma \Delta H_{f\ product}^0 - \Sigma \Delta H_{f\ reactants}^0$$

314. **Standard enthalpy of formation (ΔH_f^0):** It is defined as the change in enthalpy that takes place when one mole of compound is formed from its elements which exist in their natural states.
315. The standard state of any substance is taken its natural state at 298K or 25^0C under one atmospheric pressure.
316. **Standard enthalpy of combustion (ΔH_C^0):** The amount of heat produced when one mole of compound in its standard state, is completely burnt in excess of air or oxygen.
317. Heat of reaction = $\Delta H^0 = [\Delta H_f^0{}_{product}] - [\Delta H_f^0{}_{reactants}]$
318. **Standard enthalpy of Neutralization (ΔH_n^0):** The amount of heat produced when one mole of hydrogen ions from acid and one mole of hydroxide ions from base react to form one mole of water.
319. The heat of neutralization for strong acid and strong base reaction is -57.4 kJ mol^{-1}.
320. **Standard enthalpy of solution (ΔH_s^0):** The amount of heat evolved or absorbed when one mole of given substance is dissolved in an excess solvent so that further dilution results in no detectable change.
321. **Enthalpy change of Hydration:** The change in enthalpy when an ion is transferred from the gas phase into aqueous solution.
322. The Bond breaking of NaCl is endothermic processes.

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624 Water boils at high temperature than HF because Hydrogen bonding per molecule in H2O is greater than HF

625. An atom has net charge of -1 it has 18 electrons and 20 neutrons.it mass number is 37

626 The ionization energy of hydrogen atom is 13 6ev the ionization potential require will be 8 5 x 10-10 volt

627 Elements having same chemical properties belongs to same Group (3,11)

628. The oxidation number of Cl in Ca(ClO3)2 is +5

629. Trade name of titraflora ethylene polymer is Teflone

630. Sum of number of neutrons and protons are called Mass number

631. Water at 40 C is Heaviest

632. The most electronegative element is found in period 2

633. The bond present in solid mercury is Metallic bond

634 Substance dissolved in water react better because water Dissolves them in ions

635. 4.0 dm3 of O2 at a pressure 800 atm and 1dm3 of N2 at pressure of 100 atm are put in 2 dm container, the total pressure is 900 atm

636. The amount of heat required the temperature of 1 calorie of substance through 1 K is called Heat capacity

637 The group of animals which can run fast is Digitgrade

638. NaCl does not conduct Electric current

639. The bonds present in NH4 Cl are Ionic, Covalent and co-ordinate covalent bond

640. In PV=nRT here n is number of moles

641 London dispersion forces are present in Solid, liquid and gases

642. Stability of ionic compound is due to Lattice energy

643 The excited state of an atom which can persist for unusual longer time is Metastable state

644 A zero order reaction is one whose rate is independent of Reactant concentration

645 If the distance between two charged particle is halved The coloumb's force between them becomes Four times

646 The neutralization of strong acid by a strong base liberates an amount of energy per mole of H+ ion that is Always the same

647. Spreading of smell in room is due to diffusion

648 A well stoppered thermos flask containing some ice cubes is an example of Isolated system

649. NH3 and HCl are present at both side of pipe and diffuse to react and form NH3 Cl ,the NH3 Cl will form near the HCl end

650 Vapor pressure of mercury is less than Restified spirit, kerosene oil and Water

651. A concentrated solution has got High solute potential

652. Molecular formula of an acid C H2 O is C2 H4 O2

653. The best known fuel cell is the hydrogen/ oxygen fuel cell This is known as Bacon cell

654. CO2 is non-polar but contained Polar bonds

655. The emf from galvanic cell can be calculated from The E0 value of the half cell

656. A liquid is in equilibrium with its vapors at its boiling point On the average the molecules in the two phase have equal Total energy

657 Reason for alkali metals to be soft is that, they have Not closed packed structure
658 If the pressure and temperature of 2 litres of CO2 are doubled, the volume will become 2 litres
659. Atoms present in one mole of Ca(OH)2 are 5 x 6 023 x 1023 atoms
660. Aluminum is resistant to Corros on
661. CH4 &SiH4 have same Structure
662 A mixture of 50g H2 and 50 He has a total pressure of 1.5atm partial pressure of H2 gas is 1 0 atm
663 Calculate the volume occupied by 2 8g of nitrogen gas at STP is 22.4dm3
664. A piece of wood and iron seen to lose the same weight when completely submerged in liquid. The two pieces must have the same Volume
665 A solution of 2,0g NaOH dissolved in 1000 g of water has concentration 0.05M
666. Bohr's theory explains He+, Li++, Be+++
667 The oxidation number of hydrogen in metal hydrides -1
668 In discharge tube Neon gas will produce Pink colour
669 The value of principle quantum number l−1,the value of magnetic quantum number(m) are 1,0,+1
670. The study of heat changes accompanying a chemical reaction is known as Thermo-chemistry
671 On complete oxidation , one mole of an organic compound gave four moles of water which is Propane
672 Water is not used as thermometric liquid because it does not Expand linearly
673. Number of moles of NaCl in 75,0g of table salt 1.28
674 Oxygen atom has two unpaired electrons it is there fore Paramagnetic
675 The sample of compound contain 0.100g of hydrogen and 4 20g of nitrogen , the compound is NH3
676. Hybrid orbitals used by carbon atoms in C H4 is Sp3
677. Hybrid orbitals used by carbon atoms in C2 H4 is Sp2
678 Hybrid orbitals used by carbon atoms in C2 H2 is Sp
679 Esters are represented by general formula RCOOR
680 Ag2 S is a Not common occurring sulphur compound
681. Theoretical yield is always less than actual yield because of Reversibility, Side reaction, Mechanical loss, Human error

Chap No. 13 S AND P BLOCK ELEMENTS

682. Group-I → alkali metals
683. Group-II → alkaline earth metals

oxides	CrO	Cr_2O_3	CrO_3
Oxidation state	+2	+3	+6
Nature	Basic	Amphoteric	Acidic
	Ionic	Ionize to some extent	Covalent
	Chromous salt	Chromic compound	
	Oxidation	Stable	Reduction

The chromate – Dichromate equilibrium

950. $K_2Cr_2O_4$ or solid potassium chromate, when dissolved in water, it forms a yellow solution.

951 $K_2Cr_2O_7$ or solid potassium dichromate,when dissolved in water, it forms a orange solution

952. The colours come from the negative ions; CrO_4^{-2} and CrO_7^{-2}

953. $CrO_4^{-2} + 2H^+$ are in equilibrium with $CrO_7^{-2} + H_2O$

954. Addition of acid to the reactant shifts the equilibrium towards right and yield more orange colour

955. The addition of a base promotes the conversion of dichromate to chromate

Reduction of chromate (VI) with zinc and an acid;

956 Potassium dichromate (VI) can be reduced to chromium (III) and chromium (II) ions by using Zinc either dilute sulphuric acid or hydrochloric acid

Potassium Dichromate as oxidizing agent in organic chemistry

957 Potassium dichromate (VI) solution acidified with dilute sulphuric acid commonly used as an oxidizing agent in organic chemistry

958 Potassium dichromate (VI) oxidizes primary alcohol to formaldehyde

959. Potassium dichromate (VI) formaldehyde to formic acid.

960 Potassium dichromate (VI) oxidizes secondary alcohol to ketones.

961 Potassium dichromate (VI) does not oxidizes tertiary alcohol

Potassium Dichromate as oxidizing agent in titration

962 In redox reaction a standard solution of potassium dichromate $K_2Cr_2O_7$ is used to determine the unknown concentration of a solution of Fe^{+2}

963. Dichromate ion reduces to chromium (III)

$\rightarrow CrO_7^{-2} + 14H^+ + 6e \rightarrow 2Cr^{+3} + 7H_2O$

964. Fe (II) is oxidized to Fe(III)

$\rightarrow 6Fe^{+2} \rightarrow 6Fe^{+3} + 6e$

965. $CrO_7^{-2} + 14H^+ + 6Fe^{+2} \rightarrow 2Cr^{+3} + 7H_2O + 6Fe^{+3}$

966. $CrO_7^{-2} \rightarrow$ orange

967. $Cr^{+3} \rightarrow$ green

968 The 1:6 mole ratio with respect to amount of CrO_7^{-2} and Fe^{+2} is consumed

Manganese

969. Hite, silvery metallic element
970. Used in making alloys
971. First isolated by Swedish chemist John Gorrlieb Gahn in 1774.
972. Corrodes in moist air.
973. Dissolves in acids.
974. Melting point, 1245 degree C or 2271 ^{0}F.
975. Boiling po nt, 2061 degree C or 3742 ^{0}F.
976. Specific gravity of7.4
977. Atomic weight, 54.968

978 Manganese does not ex st in free state, except in meteors
979. Manganese is distributed in all wor d in the form of ores, such as

- Pyrolusite → magnet
- Rhodochrosite
- Franklinite
- Ps lomelane
- manganite

980 The word manganese come from Latin world 'magnes' meaning magnet
981 Manganese ranks about 12th in abundance among e ements n Earth's crust.

Oxidation state of manganese

982. +7 → Mn_2O_7 and MnO_4
983. +6 →MnO_3, Manganic salt (H_2MnO_4) and manganates (K_2MnO_4)
984. +4 → MnO_2
985. +3 → $H_2Mn_2O_4$ and $Mn_2(SO_4)_3$
986 +2 →$[Mn(H_2O_6]^{+2}$, MnO, $MnCO_3$, $MnSO_4$, $MnCl_2$
987. +3 → manganic compound
988. +2 →manganous compounds

Potassium manganite (VII) as an oxidizing agent in organic chemistry

989 Alkenes react with potassium manganite (VII) solution in cold
990. The colour change depends upon on whether potassium manganite (VI) is used under acidic condition or a kaline condit on
991 Under ac dic condition manganite (VII) is reduced to manganese ( ) ions
992 Under bas c condition the mangan te (VII are first reduced to green mangan te (VI) ons and then to dark brown solid manganese (IV) oxide or manganese oxide.
993. 7 → 6 (dark green solution)
994. 6 > 4 (dark brown precipitate)

1288 Silver acetylide → white ppt *(SAW)

1289 Copper and silver acetylides are highly explosives in dry conditions. They are decomposed by acids such as HNO_3 to regenerate acetylene

1290 None terminal alkynes can be distinguisher from terminal alkynes by Cu_2Cl_2 and NH_4OH or $Ag(NO_3)_2$ and NH_4OH

1291. Addition reactions of alkynes are

- Hydrogenation → alkenes
- Reduction by dissolving metal → alkynides/ acetylides
- Hydrohalogenation → haloalkane
- Hydration → carbonyl compounds
- Halogination → tetrahaloalkane
- Ozonolysis → ozonides →ketones → carboxylic acids

1292 Hydrogenation of alkynes leads to alkene and onward to form alkane the reaction is stopped by poisoning Pd catalyst with $BaSO_4$ + quinolone (lindlar's catalyst)

1293 1 alkynes and terminal alkynes react with metals in liquid ammonia to form salts like alkynides or acetylides

1294 Alkynes react with water inpresence of mercuric acid or sulphuric acid to form carbonyl compounds,

- Acetylene/ethyne → aldehyde
- Propyne or higher → ketones

1295 Alkynes react with ozone to form ozonide

1296 Ozonide may be decomposed by water to give ketones

1297. Ketones are foxdized by H_2O_2 to form carbonyl compounds.

1298 Special names of benzene with attached substituent

- Toluene → CH_3
- Phenol →OH
- Alfmine →NH_2
- Nezoic acid →COOH
- O-xylene, m-xylene, p-xylene → 2 CH_3
- Catechol, resorcinol, hydroquinonee → 2OH
- Mesitylene → 3 CH_3
- Durene → 4 CH_3
- Nepthalane → 2 benzene
- Anthracene → 3 benzene

1299. Bezene is colourless liquid at room temperature and pressure

1300 Benzene has pecular smell and burning tastes. 218. The specific gravity of benzene is0 8788

1301. M--benzene melts at 5.5^{0}C and boils at 80.2^{0}C.

1302 Benzene is highly inflammable

1303 The representation of real structure as a weighted average of two or more contributing structures is called resonance

1304. The hybridization of C in benzene is sp^2 223 Benezene have 6 CC and6 CH sigma bonds.

1305. Hydrogenation of
- ✓ Cyclohexene evolves 120 kJ /mol
- ✓ 1,3-cyclohexadiene gives 232 kJ/ mol
- ✓ 1,3,5-cyclohexartiene give 208 kL/ mol

1306 The resonance energy of benzene is 152 kJ/ mol *(320-208)due to unusual stability, benzene does not give addition reactions like those of alkenes.

1307 Benzene prefers to undergo electrophilic substitution reactions rather than addition reactions.

1308 The main types of reactions of benzene are ✓ Addition reactions
- ✓ Electrophilic substitution reactions
- ✓ Oxidation reactions

1309. Benzene is less reactive than alkene

1310 Benzene react with hydrogen in the presence of Ni or Pt catalyst at 150^0C, under high pressure to form cycolohexane

1311 Benzene react with chlorine or bromine in the presence of ultra light to form hexachloride.

1312 Benzene reacts with concentrated nitric acid in the presence of concentrated sulphuric acid at 60^0C to form nitrobenzene

1313 An electrophile NO_2^+ is produced by reaction of H_2SO_4 and HNO_3

1314. Benzene react with concentrated H_2SO_4 at 120^0C or fuming H_2SO_4 at room temperature to give benzene sulphonic acid

1315 Fuming sulphuric acid is concentrated sulphuric acid in which SO_3 has been dissolved.

1316 Electrophilic aromatic substitution reaction ✓ Nitration → nitrobenzene
- ✓ Sulphonation →benzene sulphonic acid
- ✓ Halogenation → halobenzene
- ✓ Friedel-crafts's acylation → alkyl benzene
- ✓ Friedel craft's acylation → aromatic ketones

1317 Treatment of benzene with n-propyl chloride gives isopropyl benzene rather than the expected n-propyl benzene

1318 Benzene reacts with alkyl halides in the presence of $AlCl_3$ to form alkyl benzenes

1319 Benzene reacts with acid halides in the presence of a lewis acid catalyst (AlCl3) to give aromatic ketones.

1320 Effects of substitution of benzene

- ✓ Directive or orientation effect
- ✓ Effect on reactivity of benzene ring

1624 Higher members of acid homologous series are wax-like solids

1625 Anhydrous ethanoic acid freezes at 17^0C to form a solid which look like ice It is, therefore also known as glacial acetic acid.

1626. Carboxylic acid are more polar than alcohol

1627 Solubility of carboxylic acid in water decreases as their relative molecular mass increases

1628 Which one of the following is more soluble in water?

- Methanoic aid ←
- Ethanoic acid
- Propionic acid
- Butyric acid

1629 The structural features of the carboxyl group are most apparent in formic acid

1630 The bond length between CO double bond is 120 pm 561 The bond length between CO single bond is 134 pm.

1631. The bond angles of H-C-O in carboxylic acids is 111^0A.

1632 The bond angles of H-C=O in carboxylic acids is 124^0A.

1633. The bond angle of O-C=C in carboxylic acids is 125^0A.

1634 The hybridization of hydroxyl oxygen in carboxylic acid is sp^2.

1635 Lone pair from hydroxyl oxygen makes the carbonyl group less electrophilic than that of aldehyde and ketone

1636 Carboxylic acid is weak acid than mineral acids

1637. Carboxylic acid is more acidic than water, phenol and alcohol

1638 Monocarboxylic acid are monobasic acids.

1639 Any electron withdrawing substituent will tend to stabilize the carboxylate ion by dispersing its negative charge and thus increase the acidity of acid

1640 Any electron donating group will tend to destabilize the carboxylate ion and thus decrease the acidity of the acid.

1641 Oder of acidity, trichloro acetic acid> Dichloroacetic acid > chloro acetic acid > methanoic acid > Ethanoic acid > Propionic acid.

1642 Carboxylic acids can be prepared by the action of Grignard reagent with carbon dioxide

1643 Reaction of carbon dioxide with Grignard reagent is known as carboxylation of Grignard reagent

1644 The reaction that provide an extension to length of carbon chain is reaction of CO_2 with R-Mg-X.

1645 Compounds having cyanide (--CN) group are called alkyl nitriles or alkyl cyanides.

1646 The carbon nitrogen triple bond in alkyl nitriles can be hydrolyzed to carboxylic acid in aqueous acid medium

1647 Primary alcohol can be oxidized to carboxylic acids by oxidizing agents like acidified potassium permanganate or potassium dichromate etc.

1648 Primary alcohol on oxidation, gives aldehyde which on further oxidation converts to carboxylic acid

1649 Oxidation of aldehydes in the presence of oxidizing agents like $KMnO_4$, $K_2Cr_2O_7$ or Ag_2O gives carboxylic acid with the same number of carbon atoms.

1650 Aromatic carboxylic acids can be prepared by the oxidation of aliphatic side chain (alky group) present on the benzene ring, with oxidizing agent like $KMnO_4$, $K_2Cr_2O_7$ any side chain is converted to carboxyl group

1651 In oxidation of alkyl benzene, the methyl group is oxidized not the aromatic ring, this show the striking stability of aromatic rings towards oxidizing agents

1652 The carboxylic acid is named so because it contains both carboxyl group and hydroxyl group.

1653 Carbon atom of carboxylic acid is less positive than that of aldehyde and ketones so it did not undergoes addition or condensation reactions like that of aldehyde and ketone.

1654. The OH donate electron to CO in carboxylic acid and hence reduce its partial positive charge so it I not attacked by nucleophiles as compared to aldehyde and ketone

1655 Acyl halides or acid halides are derivatives of carboxylic acids that are obtained by replacing OH of carboxylic acid by halogen atoms.

1656 The most reactive derivatives of carboxylic acid derivatives are alkyl halide

1657 Acyl chloride are most common and less expensive than bromides and iodides.

1658 Alkyl chlorides can be prepared by the reaction of acids with thionyl chlorides or phosphorus pentachloride (PCl_5)

1659 Acid anhydrides are derived formic aids by removing water from two carboxylic acid molecules.

1660 Naming of acid anhydrides the name of acid of carboxylic is replaced by anhydride like carboxylic acid → carboxylic anhydride

- CH_3-CO- O- CO-CH_3 acetic anhydride

1661 The most important and commercially available anhydride are acetic anhydride or ethanoic anhydride

1662. The dehydrating agent is P_2O_5.

1663 Esters are formed by replacing OH of acid by OR

1664 While naming ester the R part of OR is named first and then followed by the name of the acids, where by "ic acid" is replaced by "ate"

- Carboxylic acid → carboxylate
- CH_3-CO-OCH_3 → methyl ethanoate (ethanoic acid)

1665. When a carboxylic acid and alcohol are heated in the presence of acid catalyst, an equilibrium is established with the formation of ester and water

1666 Esterification is reaction of an acid with alcoho

1667 Ethyl acetate is important ester which can be prepared by the reaction of acetic acid with ethanol

1668 Esters can also be prepared by the reaction of an alcohol with acid halides or acid anhydride

1669 Amides are least reactive derivative of acid which is formed by the replacement of OH of acid by NH_2 group

1670 Amides are named by replacing "ic acid" corresponding acid by word "amide"

- Carboxylic acid → carboxylamide

24 Chemistry is ... science
a. Chemical
b Physical
c. Biological
d. All of these

25. The percentage of O in $C_6H_{12}O_6$ is
a 40%
b. 6.67%
c. 53.33%
d. 100%

CHAPTER NO.2 ATOMIC STRUCTURE

1. Cathode rays have momentum, it was discovered by
a Hittorf
b. Crooke
c. Pierre
d. Thomson
2. cathode rays was discovered by
a. Goldstein
b. G.J stoney
c. Chadwich
d Non of these
3. The e/m ratio for electron
a 1.602×10^{-19}
b. 9.11×10^{-31}
c 1.7588×10^{11}
d 9.54×10^{7}
4 Neutrons can knock out high speed protons from
a Paraffin
b. Water
c. Cellulose
d. All of these
5. The relation between radius and velocity of atom
a. $r \alpha v$
b $r \alpha v^2$
c. $r \alpha 1/v$
d. $r \alpha 1/v^2$
6. the equation radius of an atom is given by
a. $r = n^2h^2 \varepsilon_o / \pi Zme^2$
b. $n^2h^2 \varepsilon_o / \pi Zme$
c. $n^2h \varepsilon_o / \pi Zme^2$
d. non of these
7 Transition from n2 =2,3,4,5 etc to n1 =1 in hydrogen spectrum gives
a. Lyman
b. Balmer
c. Paschan
d. Brackett
8. Bohr's model can't explain
a. He^+
b. Li^{++}
c. Be^{+++}
d. Non of these
9. X-rays can be produced by
a Roentgen method
b. Coolidge method
c. By Betatron method
d. All of these
10 The x-rays can be
a Refelected
b Refracted
c Diffracted
d. All of these
11. Types of x-rays are
a. 2
b. 3
c. 4
d 5
12 The correct equation for Moseley's law
a. $\sqrt{v} = (Z-b)$
b. $\sqrt{v}$ a (Z+b)
c. $\sqrt{v} = a (Z-b)$
d. *non of these*
13. The maximum number of electrons in principle quantum number is calculated by

a $2n^2$
b 2(2l+1)
c. 2l+1
d. 2n

14. If value of principle quantum number is 4, then value of Azimuthal quantum number is
a. 1,2,3,4
b 0,1,2,3
c. 0,1,2
d. 0,1,2,3,4

15 If the value of azimuthal quantum number is 2, then the number of magnetic quantum number is
a. 1
b 3
c. 5
d 7

16. Total nodes =
a n-1
b. n+2
c. l
d $2n^2$

17 Angular nodes value is given by
a n-1
b l
c. n-1-l
d. non of these

18 The maximum numbers of electrons in orbitals is
a 2
b. 8
c. 18
d. 32

19 No two electrons in an atom can have the same set of four quantum numbers
a. Aafbau principle
b. Pauli's exclusion principle
c Hund's rule
d. Non of these

20. Which one of the following have less energy
a 3d
b. 4s
c. 4p
d. 4d

21 ... determined charge on electron
a Millikan
b. J.J. Thomson
c. Chadwick
d. Moseley

22. What will be the wave number of a radiation with $\lambda = 2 \times 10^{8}$ nm?
a. 100 n/m
b. 5 n/m
c. 10 n/m
d. 0.5×10^{-8} n/m

23. The frequency of green light is 6×10^{14} Hz. Its wavelength is
a 5 nm
b. 50 nm
c. 500 nm
d 5000 nm

24 If the mass of electron is doubled, the Rydberg's constant
a. Becomes half
b. Becomes double
c. Remains unchanged
d. Becomes one fourth

25 For which one of the following species, Bohr's theory does not apply?
a H
b. H^+
c. He^{+1}
d Li^{+2}

b. increase of energy
c. lowering of volume
d. increase of volume

14. the sum of al energies of all the molecules or atoms of a substance is called its
a. specific heat
b. heat capacity
c. latent heat
d. internal energy

15. which one of the following process has ΔH positive
a. ionization energy
b. electron affinity
c. combustion
d. exothermic reactions

16. which one of the following is example of non-spontaneous change
a. aging
b. gas mixing
c. bringing water uphill
d. all of these

17. which one of the folloqing show first law of thermodynamics
a. $q = \Delta E + W$
b. $q = \Delta E - W$
c. $q = -\Delta E + W$
d. non of these

18. the unit of work and heat is
a. Nm
b. J
c. $Nm^{-2} m^3$
d. All of these

19. Standard heat of neutralization is
a. 890 KJ/mol
b. -57.4 KJ/mol
c. -23 KJ/mol
d. Non of these

20. 1 dm^3 atm =
a. 101.35 J
b. 101.35 KJ
c. 100 KJ
d. 60 J

21. When one mole od ideal gas expand from 15 dm^3 to 20 dm^3 against constant pressure of 2 atm. The word=k done is
a. 2 atm dm^3
b. 4 atm dm^3
c. 5 atm dm^3
d. 10 atm dm^3

22. The amount of heat absorbed by 1g of a substance to raise the temperature by one degree
a. Heat capacity
b. Specific heat
c. The molar heat capacity
d. Non of these

23. The SI unit of heat capacity is
a. JK
b. J/K
c. K/J
d. JKK

24. Heat of reaction =
a. Heat of product x heat of reactant
b. Heat of reactant – heat of product
c. Heat of product – heat of reactant
d. Heat of product/heat of reactant

25. q =
a. nc
b. $n \Delta T$
c. $n C \Delta T$
d. $n C / \Delta T$

CHAPTER NO.12 ELECTROCHEMISTRY

1. weak electrolyte in solution is
a. completely ionized
b. slightly ionized
c. never ionized
d. destroyed

2. strong electrolyte in solution is
a. completely ionized
b. slightly ionized
c. never ionized
d. destroyed

3. which one of the following is strong electrolyte in solution is
a. ammonium hydroxide
b. carbonic acid
c. potassium iodide
d. acetic acid

4. the cathode has a charge
a. positive
b. negative
c. neutral
d. zero

5. the cations has a charge
a. positive
b. negative
c. neutral

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d. zero

6. the oxidation number of Cl in $HClO_3$ is
   a. 5
   b. 6
   c. 2
   d. 3
7. the oxidation number of Cr in $K_2Cr_2O_7$ is
   a. 5
   b. 6
   c. 2
   d. 3
8. the oxidation number of S in $S_2O_3^{-2}$ is
   a. 5
   b. 6
   c. 2
   d. 3
9. The oxidation number of manganese in MnO_4^{-1} is
   a. 2
   b. 3
   c. 4
   d. 7
10. Which one of the following is reduction reaction
    a. $Br_2 \rightarrow 2Br^-$
    b. $Fe^{+2} \rightarrow Fe^{+3}$
    c. $Zn \rightarrow Zn^{+2}$
    d. $Sn \rightarrow Sn^{+4}$
11. A cell in which a non spontaneous redox reaction is carried out by passing an electric current is not a/an
    a. Galvanic cell
    b. Voltaic cell
    c. Daniell cell
    d. Electrolytic cell
12. zinc act is cathode when coupled with aluminum, this is because reduction potential of
    a. Zn > Al
    b. Zn < Zl
    c. Zn = Al
    d. Zn =0
13. Given standard reduction potential for
    $Fe^{+2} + 2$ es $\rightarrow$ Fe -0.440 V
    $Fe^{+3} + 3$ es $\rightarrow$Fe -0.036V
    The standard electrode potential for Fe^{+3} +e $\rightarrow$Fe+2 is
    a. -0.476
    b. 0.496
    c. 0.404
    d. -.404
14. Electrolysis is a process in which the cations and anions liberated from the electrolyte are
    a. Hydrated
    b. Hydrolyzed
    c. Charged
    d. dicharged
15. a cell which produces electric current by a redox reaction is called a/an
    a. electrolytic cell
    b. voltaic cell
    c. half cell
    d. standard cell
16. the lead storage battery is a/an
    a. electrolytic cell
    b. voltaic cell
    c. standard cell
    d. half cell
17. a cell which produces electric current by a redox reaction is called a/an
    a. electrolytic cell
    b. voltaic cell
    c. dry cell
    d. electrolytic cell
18. the electrode potential of standard hydrogen electrode is
    a. 0
    b. 1
    c. -1
    d. 2
19. A cathode has the reduction potential
    a. Less than the anode
    b. More than the anode
    c. The same as that of anode
    d. Always zero
20. The oxidation number of free element is
    a. 1
    b. 2
    c. 3
    d. 0
21. Which one of the following are strong oxidizing agent/s
    a. $K_2Cr_2O_7$
    b. $KMnO_4$
    c. $K_2Cr_2O_7$ and $KMnO_4$
    d. H_2S and SO_2
22. Which one of the following is strong reducing agents

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b. 17°C
c. 27°C
d. 37°C

4. Which one of the following has high acidic
   a. Methanoic acid
   b. Chloroacetic acid
   c. Dichloroacetic acid
   d. Trichloroacetic acid
5. Which one of the following is used is a way to extend the length of a carbon chain
   a. Carbonation of Grignard reagent
   b. Hydrolysis of nitriles
   c. Oxidation of primary alcohol
   d. Oxidation of aldehydes
6. Carboxylic acid is prepared from
   a. RMgX
   b. RCN
   c. Primary alcohol
   d. Aldehyde
   e. All of these
7. Aldehyde is oxidized in the presence of
   a. Acidified $KMnO_4$
   b. Acidified $K_2Cr_2O_4$
   c. Ag_2O
   d. All of these
8. Toluene on reduction gives
   a. Benzenoic acid
   b. Benzaldehyde
   c. Benzoate
   d. Non of these
9. The reactions of carboxylic acids are
   a. Addition reaction
   b. Condenasation
   c. Attached by nucleophile
   d. Non of these
10. Most common and less expensive
    a. Acyl chloride
    b. Acyl bromide
    c. Acyl iodide
    d. All of these
11. Carboxylic acid on reaction with $SOCl_2$ gives
    a. SO_2
    b. SO_3
    c. H_2SO_4
    d. SO_2 and SO_3
12. Fischer esterification is reaction of
    a. Acid+ alcohol
    b. Acid + RX
    c. Acid + RMgX
    d. Alcohol + RX
13. Whicxh one of the following on reaction gives amide
    a. Carboxylic acid + NH_3
    b. Methyl acetate + NH_3
    c. Acetyl chloride + NH_3
    d. All of these
14. Which one of the following is least reactive
    a. Acyl chloride
    b. Acid anhydride
    c. Ester
    d. Amide
15. Decarboxylation reactions takes place in the presence of the
    a. Acid
    b. Salt
    c. NaOH
    d. Non of these
16. Which one of the following represent the formula of aromatic carboxylic acids
    a. HCOOH
    b. C_6H_5OH
    c. C_6H_5COOH
    d. C_6H_5OOH
17. Which one of the following is found in rancid butter
    a. $C_2H_4O_2$
    b. $C_3H_6O_2$
    c. $C_4H_8O_2$
    d. $C_5H_{10}O_2$
18. The compound with highest boiling point
    a. Acetic acid
    b. Water
    c. Ethyl alcohol
    d. Ether

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19. In which one of the following compounds, the centra atom does not show sp^2 hybridization
    a. Methanol
    b. Methanol
    c. Methanoic acid
    d. acetone
20. which is the strongest acid
    a. ethanol
    b. acetic acid
    c. chloroacetic acid
    d. fluoroacetic acid
21. acetic acid can by produced by the hydrolysis of
    a. methyl cyanide
    b. methylmagnesium chloride
    c. ethanol
    d. methanal
22. acyl chloride can be prepared by the reaction of a carboxylic acid with
    a. phosphorous pentaoxide
    b. soda lime
    c. hydrochloric acid
    d. thionyl chloride
23. the hydrolysis of ester in the presence of alkali is known as
    a. saponification
    b. decarboxylation
    c. esterification
    d. transesterification
24. all the acid derivatives can be converted back into the corresponding acid by one common reaction
    a. ammonolysis
    b. alcoholysis
    c. reduction
    d. hydrolysis
25. among the derivatives of carboxylic acids, the most reactive is
    a. acyl halide
    b. acid anhydride
    c. amide
    d. nitrile

CHAPTER No.21 BIOCHEMISTRY

1. The percentage of carbohydrates in animal is
    a. 1
    b. 50
    c. 80
    d. 90
2. The percentage of carbohydrates in plants is
    a. 1
    b. 50
    c. 80
    d. 90
3. Which one of the following is carbohydrate
    a. 2-dexoyribose
    b. Acetic acid
    c. Formaldehyde
    d. Non of these
4. On hydrolysis, which one of the following gives glucose-glucose
    e. Maltose
    f. Lactose
    g. Sucrose
    h. All of these
5. On hydrolysis, which one of the following gives glucose-galactose
    i. Maltose
    j. Lactose
    k. Sucrose
    l. All of these
6. On hydrolysis, which one of the following gives glucose-fructose
    m. Maltose
    n. Lactose
    o. Sucrose
    p. All of these
7. Oligosaccharides contains ..... monomers
    q. 1
    r. 2-10
    s. More than 10
    t. More than 100

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